

Hawai'i Volcanoes National Park Interpretive Program Summary

Title: Survival of the Fittest

Size: 10 - 25

Grade: 3rd

Conducted Program: 2 hour guided walk - Rain Forest & Lava Tube

Setting the Stage

Many plants and animals found in the park came without the help of people. Each one traveled more than 2,000 miles over ocean. A new species came only once every 50 to 70,000 years. There were no enemies (predator). These species began to change. How do you think they changed? Lost smell, color, thorns. Birds developed many different bills and the Nēnē lost its webbed feet. Why did this happen? How did native plants and animals come to Hawai'i? Wind, wave, wings

Activity 1 *Where Did I Come From?*

- **Complete Arrival Chart.** Students think about how each plant or animal arrived in Hawai'i. Place photo next to arrival method and tell why they think it arrived in that way.

Visual Evidence

Native plants and animals found in the park are becoming endangered because of the rapid introduction of alien species that take over the rain forest.

- 1) ID and name three native plants that came to Hawai'i by themselves. Ōhi'a lehua, 'ohelo, hapu'u
- 2) What happened to these plants after they arrived? Evolved, adapted, lost smell, thorns, etc.
- 3) Why are native plants and animals losing their growing space and homes?
Introduction of alien species (newcomers), land cleared for ranch, farm, homes, wood, etc.
- 4) What are some examples of newcomers? Ginger, faya, pig, cat, mongoose, rat, mosquito

Activity 2 *Forest Walk-Can You Find Me, Can You Help Me?*

Forest: Home to forest plants and animals. Respect, quite (forest voice), observe, listen while walking, stay on trail.

- Divide students into two groups. Observe different levels of the forest and lava tube and report to group.
 - 1) Group one observes the forest floor.
 - 2) Group two observes the under story and canopy of the forest.

Scientific Evidence

Clues for students: Look at (floor, under story or canopy), Allow students to discover and report their findings. Birds-Honeycreepers have adapted and can be found at different levels of the forest, from the floor, under story and canopy. Find a bird. What color is it? Where do you see it? Listen, look for movements, follow their song or movements. What do you see at different levels of the forest? Quietly count the number of different sounds you hear. Can you guess what sounds you hear? Can you mimic the bird calls? How many different birds are singing?

Analyzing What We See

- Do nature and people change the forest habitat? Yes How? Introducing new plants and animals, building, parking lots, trails, eruptions, wind, rain, storms. Pig ravage forest, mosquitoes transmit diseases, etc.
- How do alien plants and animals threaten natives? Yes, They out grow (crowd, shade), eat food and the plant or animal, take over or change home (habitat), etc.

Complete worksheet

Lava Tube: What might you find in Nahuku today? What might have been there before it was a park? Insects? How did Hawaiians use it? Shelter, water collection, burial

The following from Rob Pacheco, Hawai'i Forest and Trail owner:

When certain environmental conditions exist, cave-adapted creatures can be found in the dark. The discovery of these troglobitic creatures in Hawai'i turned the cave biology world upside down. In adapting to life in the dark zone, troglobites have undergone dramatic evolutionary changes. Mutations such as loss of pigmentation, loss of eyes and vision, and loss of flight were once thought to have taken much more time than was possible on our geologically-young island. The discovery of cave crickets, plant hoppers, thread-legged bugs, millipedes, and spiders adapted for the dark is one of the great stories of Hawai'i's natural history. This discovery helped to transform fundamental ideas in biologic and evolutionary sciences.



Along with cave creatures, there also exists a unique microbial world. Bacteria, molds, fungi, and other tiny life forms exist beneath us and nowhere else; some of these life forms are being studied and have shown promise as potent cancer-fighting agents.

These cave ecosystems are incredibly fragile and are impacted every time a cave is visited. Human impact on cave environments runs the gamut. Some systems are altered merely by the breathing and sweating of cavers, which changes the humidity and atmosphere in the cave section. Other impacts are much more obvious. Recreational cavers write their name in the slime mold that coats the cave walls, or spray paint graffiti or direction arrows on the floor. The Kazumura cavers, in their survey, came across sections of the cave with home rubbish piled high. They found gray water and raw sewage, as unwitting residents use Kazumura as a cesspool. Road improvements, which call for the collapsing" of Kazumura have been planned (and fiercely protested by the Hawai'i Speleological Survey). Such impacts affect caves all over the island, especially in the developed makai lands.

If you cave or would like to, please practice good caving ethics: cave only in permitted areas. Cave in small groups, with an experienced caver. Use only battery-powered lights no torches or other burning elements. Don't take anything, and don't leave anything (i.e. ti leaves; food crumbs; human waste) behind. Avoid touching roots, molds, and other organisms. Avoid handling cave formations; many are very fragile and break with the slightest touch.



Entomology

**Horticulture
& HomePest News**

Cave Crickets

One of the occasional insect pests encountered in home basements is the cave or camel cricket. The cave crickets and the well-known field crickets are from different families but look vaguely similar. Cave crickets have very large hind legs with "drumstick-shaped" femurs and long, slender antennae. They are brownish in color and rather humpbacked in appearance. They are wingless and up to one inch long.

As the name implies, cave crickets are found in caves. However, they live in other cool, damp situations such as in wells, rotten logs, stumps and hollow trees, and under damp leaves, stones, boards, and logs.

Cave crickets are of little economic importance except as a nuisance in buildings and homes, especially basements. They are usually "accidental invaders" that wander in by mistake from adjacent areas. They generally do not reproduce indoors, except in situations that provide continuous dark, moist conditions.

Control efforts for camel crickets should include (as much as is practical) eliminating breeding and hiding sites outdoors around the house or building. Piles of bricks, stones, boards, leaves, etc., should be removed. Also, cracks and gaps in foundation or siding or around windows and doors should be sealed. Spraying a residual barrier of diazinon, Dursban or Sevin insecticide around the outside of the house may be of benefit if you apply sufficient spray to reach breeding sites. Spraying household "ant and cockroach" insecticide onto indoor floor areas where camel crickets hide or are seen is a last resort of limited benefit. Occasional, individual crickets can be picked or swept up and discarded.



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Questions for lava tube:

How or why would plants and animals move from one place to another (rain forest to lava tube)? Over-crowding, loss of food, loss of habitat, etc.

What would these plants or animals need to survive? Shelter, food, water

What happens when they move to a new place? change(adapt)over time (senses, color, blind)

Why? Don't need it anymore – Use It Or Lose It. (Evolve).

What would they eat? Depends on what is available – anything that won't eat them first

Walk deep into the tube and have the students stand quietly and close their eyes to listen to the sounds of the tube?

Quietly count the sounds you hear then discuss them with each group.

Reach out and touch the tubes floor, side and upper areas softly. (Lava tube ecosystem fragile-Nahuku already disturbed. We would never touch anything in a wild cave.)

Do you see signs of life?

Activity 3 – Optional If time permits, write or draw your observations on the back of your work sheet.
Examples: aerial roots, plants (where are they?), cracks, shelves (bathtub ring),

Closing: Plants and animals native to Hawai'i came on their own and created a perfect world to survive in. What can we do to help them from becoming endangered or extinct?